

IN THE CLAIMS:

Please amend the claims as follows.

1. (Currently amended): A system for measuring a condition of a turbine engine component, said condition being selected from the group consisting of strain and combination of temperature and strain of said component, said system comprising:

a first electrically non-conducting film comprising a material selected from the group consisting of dielectric materials and electrically insulating materials, said first film being disposed on a substrate of said turbine engine component without a removal of a substrate material to compensate for a thickness of said first electrically non-conducting film; and

at least a film of an electrically conducting material disposed on said first electrically non-conducting film wherein a change in a property of said at least a film of said electrically conducting material is measured, said change in said property relating to said condition of said turbine engine component, said property being electrical resistance of said film of said electrically conducting material when said condition is strain, and said property being electromotive force developed in said film of said electrically conducting material when said condition includes temperature;

wherein said first electrically non-conducting film comprises a material that has a thermal expansion coefficient selected such that said electrically non-conducting film and said at least a film of said electrically conducting material remain adhered to films and substrates adjacent thereto through at least a cycle of extreme operating temperature, and wherein a thermal strain between said first electrically non-conducting film and said substrate is ~~positive and~~ is maintained at less than about 0.006.

2. (Canceled)

3. (Original): The system according to claim 1 further comprising a second electrically non-conducting film disposed on said first electrically non-conducting film and said at least a film of an electrically conducting material, wherein said second electrically non-conducting film comprises a material that has a thermal expansion coefficient selected such that said electrically non-conducting films and said at least a film of said electrically conducting material remain adhered to films adjacent thereto through at least a cycle of extreme operating temperature.

4. (Previously presented): A system for measuring a condition of a turbine engine component, said condition being selected from the group consisting of strain and combination of strain and temperature, said system comprising:

a first electrically non-conducting film comprising a material selected from the group consisting of dielectric materials and electrically insulating materials, said first film being disposed on a substrate of said turbine engine component without a removal of a substrate material to compensate for a thickness of said first electrically non-conducting film; and

at least a film of an electrically conducting material disposed on said first electrically non-conducting film wherein a change in a property of said at least a film of said electrically conducting material is measured, said change in said property relating to said condition of said turbine engine component, said property being electrical resistance of said film of said electrically conducting material when said condition is strain, and said property being electromotive force developed in said film of said electrically conducting material when said condition includes temperature;

wherein said at least a film of an electrically conducting material extends beyond an edge of said first electrically non-conducting film to form a thermocouple junction with said substrate.

5-9. (Cancelled):

10. (Currently amended): A turbine engine component having a condition selected from the group consisting of strain and a combination of temperature and strain, said turbine engine component comprising:

a substrate;

a first electrically non-conducting film comprising a material selected from the group consisting of dielectric materials and electrically insulating materials, said first electrically non-conducting film being disposed on a substrate of said turbine engine component without a removal of a substrate material to compensate for a thickness of said first electrically non-conducting film; and

at least a film of an electrically conducting material disposed on said first electrically non-conducting film, wherein a change in a property of said film is measured, said change relating to said condition, said property being electrical resistance of said film when said condition is strain, and said property being electromotive force developed in said film when said condition includes temperature[[:]] ,

wherein a thermal strain between said first electrically non-conducting film and said substrate ~~is positive and~~ is maintained at less than 0.006.

11. (Original): The turbine engine component of claim 10 further comprising a second electrically non-conducting film disposed on said first electrically non-conducting

material and said at least a film of an electrically conducting material, wherein said second electrically non-conducting film comprises a material that has a thermal expansion coefficient selected such that said first and second electrically non-conducting films and said at least a film of said electrically conducting material remain adhered to films adjacent thereto through at least a cycle of extreme operating temperature.

12-16. (Cancelled)

17. (Currently amended): A method for making a system for measuring a condition of a turbine engine component, said condition being selected from the group consisting of temperature, strain, and combination thereof, said method comprising:

depositing a first electrically non-conducting film on a substrate of said turbine engine component without removing a substrate material to compensate for a thickness of said first electrically non-conducting film, said first electrically non-conducting film comprising a material selected from the group consisting of dielectric materials and electrically insulating materials; and

depositing at least a film of an electrically conducting material on said first electrically non-conducting film, wherein a change in a property of said at least a film of said electrically conducting material is capable of being measured, said change in said property relating to said condition of said turbine engine component, said property being electrical resistance of said film of said electrically conducting material when said condition is strain, and said property being electromotive force developed in said film of said electrically conducting material when said condition includes temperature;

wherein a thermal strain between said first electrically non-conducting film and said substrate ~~is positive and~~ is maintained at less than 0.006.

18. (Original): The method of claim 17 further comprising depositing a second electrically non-conducting film on said first dielectric material and said at least a film of an electrically conducting material to sandwich said electrically conducting material between said first and second electrically non-conducting films, wherein said second electrically nonconducting film comprises a material that has a thermal expansion coefficient selected such that said first and second electrically non-conducting films and said at least a film of said electrically conducting material remain adhered to films adjacent thereto through at least a cycle of extreme operating temperature.

19. (Original): The method according to claim 17 for making a system for determining a condition of a turbine engine component; wherein each of said steps of depositing comprises delivering a mixture, which comprises a powder dispersed in a liquid medium, at a substantially constant rate through a nozzle onto a surface, said nozzle has an orifice from about 10 nm to about 250 micrometers, and said nozzle is

spaced apart from said surface at a substantially constant distance.

20. (Original): The method according to claim 19, further comprising heat treating a film after depositing said film and before depositing an adjacent film.

21. (Original): The method according to claim 20, wherein said heat treating comprises locally heating with a beam of energy selected from laser and electron heating.

22. (Original): The method according to claim 20, wherein said heat treating comprises annealing in a furnace.

23. (Original): The method according to claim 17, wherein said depositing at least a film of an electrically conducting material on said first electrically non-conducting film comprises depositing two spaced-apart films of different electrically conducting materials such that said space-apart films join at one end to form a thermocouple junction.

24. (Original): The method according to claim 17, further comprising depositing a third electrically non-conducting material between said two spaced-apart films of electrically conducting materials.

25. (Currently amended): A method for determining a condition of a turbine engine component, said condition being selected from the group consisting of ~~temperature~~, strain, and a combination thereof of temperature and strain, said method comprising:

providing a system on a surface of said turbine engine component for measuring said condition, said system comprising at least a film of an electrically conducting material disposed on an electrically non-conducting film, wherein said step of providing comprises selecting said electrically non-conducting material such that a thermal strain between said electrically non-conducting film and material of said turbine engine component ~~is positive and~~ is maintained at less than 0.006;

measuring a change in a property of said at least a film of said electrically conducting material, wherein said property is electrical resistance of said film when said condition is strain, and wherein said property is electromotive force developed in said film when said condition includes temperature; and

relating said change in said property to said condition of said turbine engine component.

26. (Currently amended): A method for measuring a condition of a turbine engine component, said condition being selected from the group consisting of ~~temperature~~, strain[[,]] and a combination thereof of temperature and strain, said method comprising:

providing a system on a surface of said turbine engine component for measuring said condition, said system comprising at least a film of an electrically conducting material disposed on an electrically non-conducting film, wherein said step of providing comprises selecting said electrically non-conducting material such that a thermal strain between said electrically non-conducting film and material of said turbine engine component ~~is positive and~~ is maintained at less than 0.006;

measuring a change in a property of said at least a film of said electrically conducting material, wherein said property is electrical resistance of said film when said condition is strain, and wherein said property is electromotive force developed in said film when said condition includes temperature;

relating said measurements on said change in said property to said condition of said turbine engine component; and

transmitting said condition to a remote data collection station through a communication link.

27. (Cancelled)

28. (Original): The method according to claim 26, wherein said communication link is selected from the group consisting of telephone lines with associated modems, radio frequency transmission, microwave transmission, satellite transmission, and combinations thereof.

29. (Original): The method according to claim 28, further comprising:

monitoring said condition;

detecting a condition that is outside a predetermined limit; and

performing maintenance on said turbine engine component.